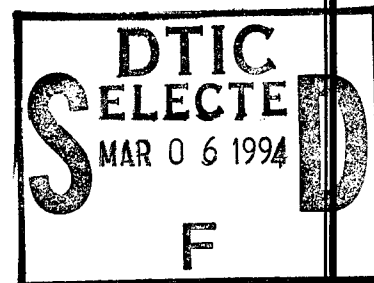# DEFENSE EQUAL OPPORTUNITY MANAGEMENT INSTITUTE

DIRECTORATE OF RESEARCH

EQUAL OPPORTUNITY CLIMATE AND TOTAL QUALITY MANAGEMENT: A PRELIMINARY STUDY

by

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EQUAL OPPORTUNITY CLIMATE AND TOTAL QUALITY MANAGEMENT:

A PRELIMINARY STUDY

The military is embracing Equal Opportunity (EO) and Total Quality Management (TQM). At first glance, these perspectives might seem unrelated. In actuality, however, these two forces are closely aligned. Moreover, the purpose of this paper is to show the relationship between EO climate and TQM. Indeed, this paper discusses the idea that EO climate may be one of the primary precursors to a successful TQM effort.

Introduction to TQM

Definition. TQM is a philosophy of management focused on defining quality in terms of what the customer desires. An overall definition of TQM is the "constant attainment of consumer satisfaction through...continuous improvement of organizational processes, resulting in high quality products and services" (Sashkin & Kiser, 1991, p. 25). The Navy Personnel Research and Development Center (NPRDC) gives a basic definition of quality under TQM: "Quality is the degree to which customer needs and expectations are met with minimal variability in the product or service at a price that the customer will pay" (Houston & Dockstader, 1989, p. 3).

TQM centers on minimizing the variability in the major processes involved in creating a product or service (Swiss, 1992). Minimal variability insures consistently high quality. Minimal variability occurs through worker quality teams monitoring the process through statistical techniques like Statistical Process Control (SPC), analyzing the process through flow charts, determining the causes of problems through cause and effect diagrams, and Pareto charts. The emphasis is upon identifying system causes of problems: manpower, machines, material, and methods. Finally, workers use these data to create new techniques and streamlining to continuously improve the process (Evans & Lindsay, 1993).

TQM focuses upon the customer as the ultimate arbiter of quality (i.e., quality is that which satisfies customer needs). TQM differentiates internal from external customers (Walton, 1990). Internal customers are those individuals inside the organization who require resources, such as information, from other organizational members in order to do their jobs. External customers are clients outside the organization (the traditional view of the customer). The important point is that TQM recognizes that servicing internal customers as well as external customers is vital to meeting organizational quality goals.

Leaders in the Quality Movement

There are several leaders, or gurus, in the Quality Movement (Gehanni, 1993).

Crosby. Philip Crosby focuses on cost integrated quality through conformance to requirements. He lists "Absolutes of Quality Management," which include: quality is conformance to requirements, quality is free (not doing the job right the first time costs money), the performance measurement is the expense of nonconformance, and the performance standard is Zero Defects. His Basic Elements of Improvement include the determination of top management to be serious about quality, education of everyone on the Absolutes of Quality Management, and implementation of the quality process.

Juran. Joseph Juran proposes company-wide quality integration flowing from hands-on leadership. He defines quality as fitness for use and identifies three major quality processes: quality planning (quality goals flowing from the strategic plan); quality control (measuring performance against quality standards); and quality improvement (working on extensive quality projects, which leads to a breaking through toward unprecedented levels of performance).

Deming. Perhaps the most well-known advocate of TQM is Deming, who sees TQM as a culture change toward continuous improvement. Deming (1986) posits 14 principles, of which several are important here.

1. Create constancy of purpose

Management must possess a long-term commitment toward continuous quality improvement. This implies a strategic plan that states this commitment and backs it up by channeling necessary resources toward quality improvement.

2. Adopt the new philosophy

Management must transform the organization starting at the top, toward continuous quality improvement. All employees must adopt the idea that mistakes are costly. At the same time mistakes are not inevitable. Doing it right the first time should be the norm.

3. Cease mass inspection

The American tradition of mass inspection goes back to Frederick Taylor's Scientific Management (Knouse, Carson, & Carson, 1993). Inspection, however, implies that the production process is inherently flawed and mistakes are inevitable. Workers focus upon quantity produced with the knowledge that quality control inspectors will identify mistakes at the end of the assembly line. In actuality, the rework of identified problems is costly. Quality comes from improvement of the process of making the product, not inspection of the product after it has been produced.

4. End the practice of competitive bidding on price alone

The lowest price bidder usually has emphasized cost cutting, rather than quality, in order to come in at the lowest price. Competitive bidding thus results in highly variable vendor materials. Instead the manufacturer as the buyer of raw materials should cultivate a long-term relationship with a few reliable suppliers who show that they emphasize quality by having a TQM program in place.

5. Improve quality constantly and forever

Quality must be built into the process. The process is then continuously monitored by statistical control techniques so that a problem can be corrected as it occurs, not after the fact.

6. Train

Workers must develop extensive job skills in order to be able to participate in continuous improvement.

7.   **Institute leadership**

Management must lead by focusing on quality improvement, removing barriers to improvement, empowering workers so that they may improve processes, and managing the system, rather than closely supervising workers. Managers should look at themselves as coaches for the employees rather than as merely order givers.

8.   **Drive out fear**

Workers are afraid that if they report problems or suggest changes they will lose their jobs. Management must drive out the sources of fear. They must cease ignoring or even punishing worker suggestions and focus instead upon positive acceptance of change.

9.   **Break down barriers**

Traditionally, workers identify with their job specializations and distrust employees from other areas. The resulting distrust sets up competing goals with other units and misperceptions of workers from other departments. Crossfunctional teams must be set up to break down barriers among departments and set up areas of cooperation.

10.   **Eliminate slogans and quotas**

Management slogans, such as Zero Defects, are worthless because they give workers no direction on how to improve the situation.

11.   **Eliminate numerical quotas**

Quotas focus upon producing quantity rather than improving quality in production.

12.   **Remove barriers that rob people of pride of workmanship**

Employees basically want to do a good job and are frustrated when barriers deny them pride in their workmanship. Typical barriers are poor training, faulty machines, and poor quality raw materials. In addition, pay-for-performance mechanisms focus employees on achieving individual pay raises, while at the same time such mechanisms divert employees from focusing on workmanship.

13.   **Education**

Workers must continuously be involved in self-improvement efforts at learning TQM skills, tools.

14.   **Take action**

The crossfunctional teams plan a course of action, test the action by statistical process control methods, and make corrections (the Plan-Do-Check-Act cycle).

TQM Awards

Baldrige Award. The Malcolm Baldrige National Quality Award was set up as a national competitive award for excellence in TQM. The Baldrige evaluates an organization's TQM efforts on seven criteria: leadership, information and analysis, strategic quality planning, human resources utilization, quality assurance, quality results, and customer satisfaction. Many organizations evaluate their TQM efforts against the Baldrige as a type of national quality standard (Hart & Bogan, 1992).

Federal Quality Institute. The Federal Quality Institute manages the President's Quality Award, which also has seven categories similar to the Baldrige Award (Public Manager, 1993). In addition, they administer the Quality Improvement Process Award. Federal civilian and military units are eligible for both awards.

Military Versions of TQM

The Department of Defense encourages the services to develop TQM programs. Each service thus has its own version of TQM. Two such programs (Air Force and Navy) are described here.

Quality Air Force. The Air Force version of TQM is Quality Air Force. The Air Force has devised the Quality Air Force criteria for evaluating the Air Force TQM effort, which mirror the Baldrige criteria: leadership, information and analysis, strategic quality planning, human resources development and management, management of process quality, quality and organizational results, and customer service (Department of the Air Force, 1993). Air Force quality teams can compete for the Chief of Staff of the Air Force Quality Award (Air Force Quality Institute, 1993).

Air Combat Command's version defines quality as "a leadership commitment to an operating style which fosters genuine trust, real teamwork, and a quest for continuous improvement in all that we do" (Air Combat Command, 1993, p. 3). They advocate several principles:

1. **Decentralization**

Push authority, responsibility, and accountability down to the lowest appropriate level. Make each unit self-sufficient in delivery of its products.

2. **Empowerment**

Motivate people by allowing them ownership of processes. Train necessary skills and allow people to contribute directly to improvement.

3. **Measurement**

Measure outcomes (e.g., goal performance) and processes leading to outputs (e.g., cycle time, defect rate, variability, delivery accuracy, customer wait time).

4. **Training**

Train in job skills, quality improvement, and professional education.

5. Leadership

Create a working climate that inspires members to challenging goals and performance to meet these goals. There is an annual quality culture and leadership survey covering six areas in the command: workplace environment, job environment, mission, communications, quality awareness, and leadership.

Navy Organizational Structure. The Navy version of TQM is Total Quality Leadership (TQL). NPRDC has laid out a three-tier structure for military TQM (Houston & Dockstader, 1989).

1. Executive Steering Committee

The Executive Steering Committee (ESC), or Quality Improvement Team (QIT), or Quality Council composed of top managers from various divisions sets the stage for TQM. They first set the direction of TQM by constructing the organizational strategic plan focused upon customer orientation and continuous quality improvement. They then charter the permanent teams.

2. Quality Management Boards

Several Quality Management Boards (QMBs) or Quality Teams composed of middle managers and worker leaders are responsible for monitoring major processes within the organization. The QMBs may identify certain problems and charter temporary teams to resolve the problems.

3. Process Action Teams

The Process Action Teams (PATs) or Corrective Action Teams (CATs) are temporary committees set up by the QMBs to resolve specific problems. They are composed of representatives (including internal and sometimes external customers) from various departments who are directly involved with the part of the process in which the problem is embedded. They brainstorm causes of the problem, construct cause-and-effect diagrams and flow charts of the process involved with the problem, collect data on various causes of the problem, and suggest improvements to resolve the problem. They are designed to be temporary teams and dissolve when the problem solution is implemented. They may have a formal ceremony, such as a dinner, in which they recognize their own efforts and then formally disband.

Diversity and TQM

Emphasis on workforce diversity began with the civil rights movement. Now the focus has greatly broadened to include many different types of workers. For example, US West defines diversity very broadly as "a culture that promotes mutual respect, acceptance, teamwork and productivity among people who are diverse in work background, experience, education, age, gender, race, ethnic origin, physical abilities, religious belief ... diversity mirrors the communities in which we work and the customers we serve" (Caudron, 1992, p. 40).

Advantages of Diversity for TQM

A workforce composed of many different employee groups can provide "value-added diversity" (can add value to organizational performance, including total quality; Cox, 1994). There are several unique advantages of a diverse workforce for the TQM program.

1.   **Widely diverse skills, knowledge, and experience**

Successful TQM depends on a multiskilled workforce (Bowen & Lawler, 1992). Diverse employee groups possess a diversity of acquired work skills, knowledge of products and processes, and experience with work techniques. Further, their diverse backgrounds present a wide range of aptitudes for skills training, which is so important to TQM.

2.   **Diverse inputs into quality teams**

TQM relies on quality teams to monitor processes, identify problems, and arrive at solutions. The emphasis is usually upon crossfunctional teams in order to cover all important aspects of a quality problem (Evans & Lindsay, 1993). Insuring diverse workforce representation on teams, however, provides a number of different (and hence richer) perspectives on defining the problem, approaches to the problem, and arriving at possible solutions (Ruhe & Eatman, 1977). For example, diverse viewpoints can stimulate productive discussion (Watson, Kumar, & Michaelson, 1993). And diversity enhances the level of critical analysis of decisions (Nemeth, 1985). Moreover, diverse work teams can produce more feasible and effective ideas than homogeneous work teams (McCleod, Lobel, & Cox, 1992).

Moreover, length of team interaction may be a crucial factor in how diversity influences team effectiveness. An experimental study showed that newly formed diverse teams each composed of a white, African-American, Hispanic, and a foreign national did not perform as well initially on problem solving tasks as did homogeneous groups (all members of one ethnic group). The diverse teams reported more difficulty at first agreeing on what was important and in working together. After several months, however, the diverse groups surpassed the homogeneous groups on range of problem perspectives and alternative solutions generated (Watson et al., 1993).

3.   **Input for TQM tools**

TQM uses a variety of problem-solving tools, such as cause-and-effect diagrams, flow charts, Pareto charts, and brainstorming (Evans & Lindsay, 1993). A diverse workforce can enhance the use of these tools. For example, research has shown that heterogeneous groups (members with different needs, personalities, orientation, and background) produce high quality problem solving because they stimulate each other's abilities. Moreover, heterogeneous groups are particularly effective on complex tasks that require diverse problem solving approaches (Szilagyi & Wallace, 1990), which directly describes many quality problems. In the TQM setting, then, diversity as well as crossfunctionality should be considered when composing quality teams.

4.   **Diversity as a key to meeting customer needs**

Ultimately the customer drives the TQM effort; customer needs define quality for the TQM organization (Deming, 1986). A diverse workforce has a larger representation of the diverse types of customers many American businesses serve. Such a workforce will better know and understand the needs of a diverse customer base. In addition, a diverse workforce can provide unique insights into marketing toward diverse customers (Cox, 1994).

If the organization is in the service sector, customers may feel more comfortable and hence better served if they see company employees similar to themselves. Further, if they have particular needs, such as the need to translate information from one language to another for ethnic groups, workers of the same ethnic group may be the only employees who could fulfill this need. For example, US West focuses on Hispanic resource groups to help them understand and service the Hispanic market in the Southwest (Caudron, 1992).

Climate Assessment and Equal Opportunity

Many successful TQM organizations, including several Baldrige winners, have extensive organizational climate assessments of employee participation, employee development, and employee concerns (Caudron, 1993). In addition, the Air Force Air Combat Command has their annual Quality Air Force climate and leadership survey. There is, then, an established tradition of climate assessment, which can be logically extended into EO climate evaluation.

Indeed, the Defense Performance Review, part of Vice President Gore's National Performance Review, states as its fourth recommendation for implementing TQM that DoD establish an environment where TQM principles can thrive. This includes redesigning DoD reward and recognition systems, performance appraisal, and employee inputs into the system. The anticipated result is a change of organizational culture toward incorporation of TQM into every process of DoD (Armed Forces Information Service, 1994).

Military Equal Opportunity Climate Survey

The Department of Defense (DoD) has developed a measure of EO climate through the Defense Equal Opportunity Management Institute (DEOMI) called the Military Equal Opportunity Climate Survey (MEOCS). The MEOCS is composed of about 100 questions tapping various areas of discrimination, sexual harassment, and organizational effectiveness (DEOMI, 1993; Dansby & Landis, 1991).

MEOCS Scales

Several MEOCS scales are of interest here. Indeed, these reflect several of the organizational principles put forth by Deming (1986).

Positive EO Behaviors. This involves how well different types of military people (e.g., minority and majority) get along and how well they are integrated into the unit functioning. A high score indicates positive interactions. Moreover, empowerment, which is crucial to quality team performance, depends on employees behaving responsibly toward each other in a positive manner (Dobbs, 1993). Deming's (1986) ninth principle involves breaking down barriers so members can interact more closely.

Commitment. This involves organizational commitment and the tendency of members to want to stay in the service. Deming's first principle of constancy of purpose and second principle of adoption of philosophy implies a commitment - to quality enhancement and, ultimately, quality as an integral part of the organizational culture.

Perceived Work Group Effectiveness. This scale measures the degree to which the unit is perceived to be productive and effective. This is similar to Deming's ninth principle of workers interacting more effectively.

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Job Satisfaction. Job satisfaction here refers to satisfaction with the job, helping others to improve skills, job security, and pride in the job. Deming's twelfth principle involves pride in the work. In addition, his sixth and thirteenth principles involve skills training. Quality teams operate effectively when individuals enhance each other's input.

Overall EO Climate. This measures how individuals view EO as a whole in the unit.

Other EO Scales. The MEOCS also measures sexual harassment and discrimination, differential command behavior (treatment of minorities), racist/sexist behaviors, "reverse" discrimination, discrimination against minorities, and attitudes toward racial separation.

Purpose of the Present Study

This study is a preliminary investigation of the relationship of military EO climate and TQM. A positive EO climate relatively free of discrimination and harassment should allow diverse types of individuals to contribute to team efforts and quality improvement.

Methods

Selection of Recognized TQM Units

A search was undertaken for military units practicing TQM who had attained some type of recognition for their efforts. Several sources were explored: military winners and finalists of the Federal President's Quality Award and Quality Improvement Process Award, winners of the Chief of Staff of the Air Force Quality Award, references to military units in the TQM literature, and military publications citing TQM efforts (e.g., Airman, All Hands, Soldiers).

MEOCS Data Base

DEOMI maintains a data base of all respondents to the MEOCS administered by units over the last five years. A search for military units who had been administered the MEOCS and which also had been cited for their TQM efforts resulted in the identification of three units who met both these criteria: a supply unit, a military hospital, and an aviation unit.

Results

MEOCS Scales

Table 1 shows the means of the 12 MEOCS scales for the three units. In general the means were comparable to the overall means for all MEOCS administrations. In some cases the TQM organizations had somewhat higher means. While the three units differed on some scale means, the amount of variance accounted for by the main effects (eta^2) is small. The three units had a higher percentage of female and minority respondents than the average for all units who have completed the MEOCS.

Correlation of the MEOCS Quality Item with the MEOCS Scales

Item 64 of the MEOCS (Eff64), "The quality of output of my work group is very high," is an indicator of perceived quality and teamwork, two important aspects of TQM. Table 2 shows the correlation of this item with the 12 MEOCS scales. Quality correlated highly with work group effectiveness, commitment, and satisfaction, but also with positive EO behaviors and attitudes toward racial separation.

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Table 1

Means for MEOCS Scales for the Three Military TQM Units

MEOCS Scale	Overall MEOCS M (N=205,275)	Three Unit M (n=1229)	Supply Unit M (n=284)	Hospital Unit M (n=49)	Aviation Unit M (n=896)	F (df=2,1226); eta²
1. Sex Harassment/ Discrimination	3.84	3.81	3.87	3.80	3.80	<1
2. Differential Command Behavior	4.22	4.15	4.23	4.30	4.10	3.55*; .01
3. Positive Equal Opportunity Behaviors	3.71	3.68	3.89	3.51	3.62	12.78***; .02
4. Racist/Sexist Behaviors	3.76	3.82	4.09	3.65	3.75	18.06***; .03
5. Reverse Discrimination (I)	3.94	3.89	3.81	4.11	3.90	3.43*; .01
6. Commitment	3.28	3.17	3.24	3.15	3.13	2.27ns
7. Work Group Effectiveness	3.90	3.92	4.11	3.93	3.83	9.97***; .02
8. Job Satisfaction	3.66	3.63	3.64	3.92	3.60	3.15*; .01

*p < .05
**p < .01
***p < .001

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9. Discrimination Against Minorities	3.76	3.69	3.82	3.56	3.65	3.37*; .01
10. Reverse Discrimination (II)	3.36	3.42	3.43	3.61	3.40	1.09ns
11. Attitude Toward Racial Separation	4.22	4.26	4.33	4.38	4.21	2.74ns
12. Overall Equal Opportunity Climate	3.39	3.36	3.41	2.90	3.36	5.18**; .01
Diversity Indices						
Percent Minority	36%	43%	38%	43%	45%	
Percent Female	16%	22%	25%	39%	20%	
Percent Officer	15%	7%	8%	45%	5%	
Percent Junior Enlisted (of Enlisteds)	66%	77%	76%	81%	78%	
Percent Junior Officer (of Officers)	53%	46%	50%	29%	57%	
Percent Military	90%	87%	67%	100%	93%	

*p < .05
**p < .01
***p < .001

Table 2

Correlations of MEOCS Quality Item with MEOCS Scales

MEOCS Scale	Correlation with MEOCS Quality Item (Eff64)			
	Three Units (n=1227)	Supply Unit (n=284)	Hospital Unit (n=49)	Aviation Unit (n=894)
1. Sex Harassment/ Discrimination	0.15***	0.20***	0.13	0.13***
2. Differential Command Behaviors	0.21***	0.27***	0.25*	0.18***
3. Positive Equal Opportunity Behaviors	0.33***	0.44***	0.19	0.30***
4. Racist/Sexist Behaviors	0.13***	0.24***	0.11	0.09**
5. Reverse Discrimination(I)	0.14***	0.14**	0.33*	0.13***
6. Commitment	0.25***	0.28***	0.29*	0.24***
7. Work Group Effectiveness	0.83***	0.87***	0.71***	0.82***
8. Job Satisfaction	0.46***	0.45***	0.47***	0.46***
9. Discrimination Against Minorities	0.15***	0.21***	0.13	0.13***
10. Reverse Discrimination(II)	0.06***	0.11*	0.13	0.04
11. Attitude Toward Racial Separation	0.31***	0.38**	0.10	0.29***
12. Overall Equal Opportunity Climate	0.16***	0.13*	0.44***	0.15***

*p < .05
**p < .01
***p < .001

Correlation of the MEOCS Quality Item with Selected MEOCS Items

Table 3 shows the correlation of the quality item with individual items in the MEOCS. Only those correlations of .25 and above are listed. Of course, because quality correlates highly with the scales of work group effectiveness, commitment, and job satisfaction, it correlated with most of the items in these scales. In addition, however, quality correlated with minorities' being asked to contribute suggestions, cross-ethnic socializing, fair treatment, and supervision by different races.

Regression of MEOCS Items on Quality of Workgroup Output

Table 4 summarizes a regression of MEOCS items on Eff64, quality of workgroup output, as the dependent variable for the entire sample. An equation of five items achieved an $R^2 = 0.59$: work output quantity, work group use of resources, high work-group performance, minorities and majority working separately (negative item), and helping people improve, $F(5,1190) = 340.38$, $p < .001$.

When a stepwise regression was performed on Eff64 for minority members of the sample (n=358), a slightly different equation resulted. Table 5 shows that four items reached an $R^2 = 0.58$: work output quantity, work-group performance, minority power, and work group use of resources, $F(4,492) = 172.72$, $p < .001$.

Table 6 shows the results of a stepwise regression for female members of the sample (n=195). Four variables predicted Eff64 for an $R^2 = 0.67$: work output quantity, work-group performance, work group use of resources, and non-official social activities, $F(4,244) = 126.67$, $p < .001$.

For the present data, quality and quantity of work-group output were significantly correlated, $r = 0.73$, $p < .001$. There may be a question, then, whether these two perceptions were interchangeable for the respondents (i.e., they perceive that other variables are related to quality and quantity in the same way). To test this possibility, the three regressions (total sample, minority subsample, and female subsample) were re-run with work group output quantity as the dependent variable. The resulting regressions differed from the regressions on quality.

For the total sample, the regression equation included the other four variables in the work group effectiveness scale (quality, performance, prioritizing, and resources, entered respectively). For minorities, the equation contained only three variables, which were all from the work group effectiveness scale (quality, performance, and resources, respectively); for females, the equation contained only two variables, which were also from the work group effectiveness scale (quality and performance). These results show that respondents saw quality and quantity relating differently to other factors. Apparently, respondents viewed quantity as almost exclusively a function of work-group factors, while they saw quality as a function of other variables, including equal opportunity climate, in addition to work-group variables.

Discussion

Relation of Perceived Quality of Work-Group Output to EO

The three units with recognized quality programs had a higher percentage of females and minorities than the overall MEOCS population; (i.e., these units contained fairly diverse work groups). Furthermore, they appeared to be fairly well-functioning units. Perceived

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Table 3

Correlation of MEOCS Quality Item with Other
Individual MEOCS Items

| MEOCS Item | Correlation of Item with Quality Item (Eff64) (r of .25 or higher) | | | |
	Three Units (n=1102)	Supply Unit (n=255)	Hospital Unit (n=46)	Aviation Unit (n=801)
Behavioral Items				
19. In staff meetings, females and minorities asked to contribute suggestions to solve problems	0.25***	0.43***	0.10	0.14***
29. Majority and minority seen socializing together	0.25***	0.30***	0.14	0.24***
35. Whites joined minority friends at same cafeteria table	0.27***	0.44***	0.17	0.26***
37. Supervisor gave same punishment to minority and whites for same offense	0.28***	0.28***	0.31*	0.26***
50. At non-official social activities minorities and majority seen socializing in same group	0.27***	0.28***	0.18	0.26***
Commitment Items				
53. Proud to tell others part of this organization	0.31***	0.41***	0.43**	0.28***
56. Organization inspires me to perform in best manner	0.32***	0.36***	0.26*	0.29***
58. Extremely glad to work for this organization	0.25***	0.23***	0.32*	0.23***
61. This organization is the best of all possible ways for me to serve my country	0.25***	0.29***	0.21	0.22***

*p < .05
**p < .01
***p < .001

Work Group Items

63. Amount of output of my work group is very high	0.73***	0.80***	0.73***	0.71***
65. When priority work arises (short suspenses, crash programs, schedule changes) people in my work group do outstanding job handling these situations	0.56***	0.69***	0.47**	0.54***
66. Work group always gets maximum output from resources (personnel and materials)	0.51***	0.59***	0.33*	0.50***
67. Work group performance in comparison to similar groups is very high	0.60***	0.66***	0.44**	0.60***

Job Satisfaction Items

68. Chance to help people and improve their welfare through my job performance	0.38***	0.41***	0.40**	0.38***
69. Amount of effort compared to co-workers	0.35***	0.41***	0.16	0.36***
70. Recognition and pride my family has in my work	0.28***	0.23***	0.29*	0.30***
72. Chance to acquire valuable skills in my job	0.28***	0.28***	0.41**	0.29***
73. My job as a whole	0.37***	0.44***	0.54***	0.33***

$*p < .05$
$**p < .01$
$***p < .001$

Racial Issues

79. Organization committed to principle of fair treatment for all	0.25***	0.30***	0.26*	0.26***
80. After hours government employees should stick together in groups of their race only	-0.26***	-0.30***	-0.07	-0.28***
87. Minorities and majority better off if lived and worked only with people of own race	-0.30***	-0.37***	-0.18	-0.26***
88. Dislike idea of having supervisor of different race	-0.26***	-0.33***	-0.08	-0.26***

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*p < .05
**p < .01
***p < .001

Table 4

Regression of MEOCS Items on MEOCS
Quality Item for the Total Sample

MEOCS Item	B	Beta	F (on entry)
63. Amount of output of my work group very high	0.48	0.50	412.40***
65. When priority work arises, work group outstanding in handling situations	0.15	0.16	39.37***
67. Work group performance in comparison to others very high	0.15	0.15	31.72***
87. Minorities and majority better off if worked only with people of own race	-0.07	-0.07	12.89***
68. Chance to help people improve their welfare through my performance	0.06	0.06	7.61**
Constant	0.54		20.52***

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   n = 1196
  *p < .05
 **p < .01
***p < .001
```

Table 5

Regression of MEOCS Items on MEOCS
Quality Item for Minorities in the Sample

MEOCS Item	B	Beta	F (on entry)
63. Amount of output of my work group very high	0.50	0.54	206.36***
67. Work group performance in comparison to others very high	0.18	0.19	21.09***
92. Power in the hands of minorities dangerous	-0.09	-0.09	9.17**
66. Work group always gets maximum output from resources	0.09	0.03	7.60**
Constant	0.73		22.50***

n = 497
*p < .05
**p < .01
***p < .001

Table 6

Regression of MEOCS Items on MEOCS
Quality Item for Females in the Sample

MEOCS Item	B	Beta	F (on entry)
63. Amount of output of my work group very high	0.43	0.47	96.82***
67. Work group performance in comparison to others very high	0.22	0.25	19.98***
65. When priority work arises, work group outstanding in handling situations	0.15	0.18	10.03**
50. At non-official social activities minorities and majority seen socializing in same group	0.07	0.10	6.32*
Constant	0.14		2.23ns

```
     n = 249
   *p < .05
  **p < .01
 ***p < .001
```

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quality of work-group output correlated with a number of commitment, work-group, and job satisfaction items. In addition, it correlated with minority contribution via suggestion, differential group socializing, and fairness of treatment. Several of these items relate to TQM principles, such as the suggestion process (which is central to quality improvement), breaking down barriers among groups, and driving out sources of fear among groups (here discrimination and harassment). Such items might form the basis for a work quality scale for the MEOCS.

The minority and female subsamples generally agreed with the majority on the relation of quality and group effectiveness. There were some differences, however, in how minorities felt about minority power and how females perceived non-official social functions. Further research should clarify the impact of these and similar variables on group quality efforts.

EO Climate as Precursor to TQM Climate

It can be argued here that a positive EO Climate may well set the stage for successful TQM. Indeed, there are calls for a contingency theory of TQM that posits success of the TQM program as a function of a number of organizational and environmental variables, including closeness of fit of pre-existing attitudes and organizational culture values (Spencer, 1994; Wilson & Durand, 1994). In fact, a positive EO climate already in place may shorten the initial period of time when diverse quality teams are learning to work together. (Of course, it may also work the reverse way: quality may lead to improved EO.)

Unity of Direction.

The first Deming principle of TQM is constancy of purpose--everyone is going in the same direction of quality improvement. In order for this to occur, there must be constancy in the organizational environment--everyone focused on the organizational goals. A positive EO climate should indicate some unity in overall direction. Notice that this does not imply everyone possesses the same values or even personal goals, but rather agreement with overall goals.

Empowerment.

TQM requires empowerment of its members in order to make effective quality decisions. In a positive EO environment, members should feel relatively free of discrimination and sexual harassment that might block their exercise of empowerment. In other words, they are not constrained by discrimination or harassment from making suggestions for quality improvement and implementing quality decisions.

An interesting finding in the present study was the linkage of perception of minority power with quality for the minorities in the three quality units. The TQM literature views empowerment both as the possession of sufficient skills and as a sufficient degree of decentralization in order that individuals can participate effectively in quality decision making (Dobbs, 1993). Perhaps there should be a further examination in TQM research of what constitutes a sufficient group and organization work climate for effective empowerment of a diverse work force.

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Cohesiveness.

In order for TQM quality teams to operate effectively, there must be some degree of cohesiveness. Cohesive teams operate more smoothly and can allow individuals to seek help from the group in performing their own tasks (Evans, 1986). Further, standards of excellence (here quality) may be a primary factor in instilling task commitment in team members, which in turn is a central factor in building cohesiveness. Indeed, the team's own efforts at creating performance standards, which others term "self-regulation" (and which TQM advocates term "empowerment") may enhance such task commitment (Mullen & Copper, 1994).

Barriers Reduced.

Barriers hinder the operation of crossfunctional teams. In addition, individuals are hesitant to suggest new ideas for fear of retribution. A positive EO climate has removed the barriers of discrimination and harassment in interpersonal interactions and thus enhances the motivation of individuals to contribute to group performance (Cox, 1994).

Adaptive to Change.

Continuous improvement requires flexibility and little resistance to change. And a diverse workforce produces a flexible, innovative organization responsive to change (Cox, 1993; Morrison, 1992). A positive EO climate existing for this diverse workforce means that individuals are accepting of differing views and open to different ideas.

Understanding and Support of Diverse Values.

TQM focuses on satisfying customer demands - both internal and external customers. To satisfy demands of differing types of customers requires a understanding of different perspectives. A positive EO climate indicates that organization members do not hold narrow views but rather are familiar with diverse perspectives and values. Moreover, a cohesive EO climate means that members actively support differing views.

Problems

Building Cohesion among Diverse Individuals.

Diversity may expand input into teams, but at the same time can make cohesiveness harder to attain. Extensive team building training is required to build cohesion among individuals from differing backgrounds. The cohesiveness literature shows that individuals can become more cohesive when there are common values and goals (Berkowitz, 1954). Team training must first emphasize commonalities among individuals in order eventually to benefit from their diversity. Moreover, cohesion develops from shared successes (Lott & Lott, 1965). Therefore, team building should emphasize tasks on which members can experience early success.

Limitations of the Present Study

This is a preliminary exploration of TQM and EO. No definitive conclusions can be made at this point with data from only three units. A larger sample of units is necessary.

The major dependent variable in this study was a perceptual measure of quality of group output. While tapping two important aspects of TQM (quality and group effort), this measure still suffers from the problem of subjectivity inherent in any self-report item. It should be noted, however, that respondents did perceive differences among the variables. For example, they saw work group quality and quantity to be a function of differing sets of variables, which should make orthodox "Demingites" happy (Deming, 1986) believed that quantity measures of performance misdirect the organization away from continuous quality improvement and thus they should be divorced from one another). Nevertheless, objective measures of quality (e.g., cost savings, error rates, or customer wait times) are needed as dependent variables in future studies to show the actual impact of work team diversity on TQM performance.

An additional problem concerns the specificity of the unit data. The current MEOCS data may not allow a fine enough break out of units in all cases. For example, the hospital data had an n of only 49, even though this is a large military hospital. We are not certain from what part of the hospital the sample was drawn, although the entire hospital has a TQM program. The aviation unit is a large sample combining a number of units, although, again the entire unit has had a TQM program.

Recommendations

1.   Build a data base of EO climate in quality-oriented units

To date, there is no real linkage of EO climate data and TQM unit data. It is proposed that DEOMI first generate a list of already identified quality units (e.g., the Federal Quality Institute award winner lists is a starting point; see Table 7). Then DEOMI would administer the MEOCS to a sample of these recognized quality-oriented units. DEOMI could then build a data base of MEOCS scale information. Statistical comparisons with other military units may occur for norming purposes. In addition, such a data base would identify potential problem areas (i.e., EO areas that should be emphasized as the TQM program in a unit develops).

2.   Construct a Quality Scale for the MEOCS

This study showed that a number of EO, commitment, group effectiveness, and job satisfaction items correlated with the quality items. A quality scale could be developed from these items.

In order to fit TQM, additional items might be written into the MEOCS to reflect principles of TQM, such as quality team performance, customer orientation, empowerment, and decentralization. Some suggested items are:

Work Group Effectiveness Items

The scale would follow the MEOCS Part III scale: 1=totally agree to 5=totally disagree.

o My work group output is oriented toward satisfying internal customers (other units that my unit supports within our organization).

o My work group output is oriented toward satisfying external customers (other units that my unit supports outside of my organization).

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Table 7

Quality Awards Conferred on Military
Organizations by Federal Quality Institute

Award	Year	Winner	Contact
Presidential Quality Award			
	1994	Naval Air Systems Command	Jim Weathersbee Special Assistant for TQL (703)604-2800
	1991	HQ Air Force Materiel Command	Kenneth A. Schaper HQ AFMC/XPMQ (513)257-2536
	1989	Naval Air Systems Command	Jim Weathersbee Special Assistant for TQL (703)604-2800
Quality Improvement Prototype (QIP) Award			
	1994	Army Tank-Automotive R&D & Engineering Center	Sandy K. Pollum (810)574-5063
		Air Force Electronic Systems Center	Dr Lee Pollock (617)377-5183
		Naval Undersea Warfare Center	John Ebert (206)396-7982
	1993	Naval Air Warfare Center Aircraft Division	Hal Unger (908)323-7569
		Naval Aviation Depot	John C. Adams (919)466-7403
	1992	Defense Contract Management District	Karen Cleaves (617)451-4232

1991	Sacramento Air Logistics	Jim Folz (916)643-1165
	1926th Communications Computer Group	Gloria Patman (912)926-7687
1990	Defense Industrial Supply Center	Wanda Thower (713)483-4216
1989	Naval Publications and Forms	
	Norfolk Naval Shipyard	James T. Benn (804)396-9490

QIP Finalists

1994	Air Force Aerospace Guidance and Metrology Center	Michael Foran (614)522-7384
	Red River Army Depot	Patsy Pierce (903)334-2110
1993	Defense Logistical Supply Center	Col Lawrence Simpson (616)961-4989
	Naval Supply Center, Oakland	Capt Kurt W. Libby (510)302-5201
	Air Force Medical Center, Wright-Patterson	Col Lloyd Dod (513)257-8762
1991-1992	Naval Supply Center, Yokosuka, Japan	Lt Michael Kelly 81-311-734-7909
	Naval Aviation Depot, Norfolk	Sharon Doggett (804)545-1111
	Naval Avionics Center, Indianapolis	Ruth Dougherty (317)353-7050
	Naval Supply Center, San Diego	Mike Stames (619)532-1689
	Naval Ship Systems Engineering	Sondra Gutkind (215)897-7828
	Air Force Aeronautical Systems	Gary Ebert (513)255-1755

o My work group is empowered to make important decisions in order to improve the quality of our work.

o My work group can work closely with other work groups in my organization in order to solve quality problems.

o My work group strives toward continuous quality improvement.

Commitment Items

The scale would follow the MEOCS Part II Organizational Commitment scale: 1=totally agree to 5=totally disagree

o The leadership of my organization supports continuous improvement of the quality of our work.

o The leadership of my organization supports decentralized decision making (units can make important decisions on their own).

o The leadership of my organization supports training in quality tools, such as statistical process control, quality problem solving, and quality team building.

o The leadership of my organization supports crossfunctional activities (members of different work groups can work closely together) in order to solve quality problems.

Deming's Fourteen Principles

The following are selected items adapted from a Naval Postgraduate School thesis measuring organizational acceptance for Deming's 14 principles (Nicholls, 1991). The scale is 1=Strongly agree to 5=Strongly disagree:

o Long term planning should be made at levels lower than the commanding officer. [Principle 1 "Constancy of purpose"]

o I believe that we should put more emphasis on improving the quality of what we do than meeting budget (money) and schedules (time required to meet specific objectives). [Principle 2 "Adopt the new philosophy"]

o Continuous improvements to quality of personal or unit performance cost more time, money, or other resources. [Principle 5 "Improve constantly"]

o A good leader sets goals and targets for mission accomplishment. [Principle 7 "Institute leadership"]

o Leadership by fear and force is intolerable. [Principle 8 "Drive out fear"]

o Team work within a unit is a primary requirement for achieving mission accomplishment. [Principle 9 "Break down barriers]

o One of a leader's most important jobs is to remove organization/system barriers (people, policies, procedures, etc.) that hinder efficiency and effectiveness. [Principle 12 "Remove barriers to pride in workmanship"]

o Continuing education for all personnel should be among the foremost concerns of unit leadership. [Principle 13 "Institute education"]

o Leaders should not work directly with subordinates on the process. They should only supervise. [Principle 14 "Take action"]

AF Quality Institute Organizational Assessment Survey

Another alternative would be to merge DEOMI MEOCS data with the Organizational Assessment Survey data maintained by the Air Force Quality Institute (AFQI). The AFQI survey is 119 items (including demographic questions) evaluating the quality climate of an organization based upon the seven Baldrige criteria: leadership, information and analysis, strategic quality planning, human resources development and management, management of process quality, quality and operational results, and customer satisfaction. The contacts at AFQI are Dr. Paul Grunzke or SSgt Strickler at DSN 493-4047.

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